

Cont. sub. #12

bringing] placing the component [and the] into a nest [into contact] having
an asymmetrically shaped recess corresponding to the physically asymmetric marker on
the component; and[,]

detecting whether the physically asymmetric marker on [said] the
component mates with the asymmetrically shaped recess.

subcl. 5. (Amended) The method of claim 3, wherein said detecting [the alignment
includes providing a sensor within the recess to distinguish] further comprises
distinguishing when [the leads or] the component [are] is in [the] a predetermined
alignment.

6. (Amended) The method of claim 5, wherein [providing a sensor includes
providing a vacuum sensor] said detecting further comprises:
creating a low pressure region in the recess; and
sensing a pressure in the low pressure region.

7. (Amended) The method of claim 5, wherein [providing a sensor 10
includes providing a contact sensor] said detecting further comprises sensing when a
component contacts a surface of said recess.

8. (Amended) The method of claim 3, wherein said detecting [the alignment
includes providing a receiver to detect] further comprises detecting whether the fiducial
marker of the component mates with the asymmetrically shaped recess.

5hB2- 9. (Amended) The method of claim 8, wherein[:
]detecting the alignment further [includes positioning an emitter to]
comprises:
[direct] directing a pattern of radiation [toward] above and parallel to the
recess in the nest; [and,]
[providing a receiver further includes providing a receiver in a position to
receive emitted] receiving the radiation pattern that passes the recess;

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[indicative of] comparing the received radiation pattern to a predetermined radiation pattern; and

determining whether the fiducial marker is mated with the asymmetrical shaped recess.

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10. (Amended) The method of claim 1, [wherein providing a fiducial marker includes providing] further comprising forming a superficial asymmetric marker on said component.

11. (Amended) The method of claim 1, [wherein providing a fiducial marker] further [comprises] comprising forming [providing] multiple fiducial markers on said component.

12. The method of claim 1, wherein detecting the alignment further comprises detecting the fiducial marker visually.

Please add the following claims:

44. A method of placing a component having leads and an alignment indicating fiducial marker, comprising:

detecting the alignment of the fiducial marker on the component;
comparing the detected fiducial alignment with a predetermined fiducial alignment; and

placing the component to a substrate when the detected fiducial alignment corresponds to the predetermined fiducial alignment.

45. The method of claim 44, wherein the fiducial marker corresponds to an alignment of the leads of the component.

46. The method of claim 44, wherein said detecting further comprises detecting an orientation of the fiducial marker.

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47. The method of claim 44, wherein said detecting further comprises detecting an orientation of the component.

48. The method of claim 44, wherein said placing the component further comprises placing a substrate in a component mounting area.

49. The method of claim 48, wherein said placing the component further comprises moving the component to the component mounting area.

50. The method of claim 44, further comprising discarding the component when the detected fiducial alignment does not correspond to the predetermined fiducial alignment.

51. The method of claim 44, further comprising halting operation of a component transfer apparatus when the detected fiducial alignment does not correspond to the predetermined fiducial alignment.

52. The method of claim 44, further comprising altering operation of a component transfer apparatus when the detected fiducial alignment does not correspond to the predetermined fiducial alignment.

53. The method of claim 44, further comprising continuously feeding components to the component feed assembly.

54. A method of placing a component having leads, comprising:
placing the component in a nest having a surface and an asymmetric recess defined therein;
detecting the alignment of the component in the recess;
comparing the detected alignment with a predetermined alignment; and
placing the component to a substrate when the detected alignment corresponds to the predetermined alignment.

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55. The method of claim 54, wherein said detecting further comprises focusing an alignment detector on the surface of the nest.

56. The method of claim 54, wherein said detecting further comprises focusing an alignment detector above the nest.

57. The method of claim 54, wherein said detecting further comprises focusing an alignment detector parallel to and adjacent the surface of the nest.

58. The method of claim 54, further comprising picking the component from the nest.

59. The method of claim 58, further comprising aligning the component.

60. The method of claim 59, further comprising replacing the component in the recess of the nest.

61. A method of placing a component having leads and an alignment indicating fiducial marker shape, comprising:

detecting the alignment of the fiducial marker shape of the component;
comparing the detected fiducial alignment with a predetermined fiducial alignment; and

placing the component to a substrate when the detected fiducial alignment corresponds to the predetermined fiducial alignment.

62. The method of claim 61, wherein said detecting further comprises:
forming a recess in a nest corresponding to the fiducial marker shape of the component; and
placing the component in the recess.

63. The method of claim 62, wherein said detecting further comprises determining whether the component extends beyond the surface of the nest.

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5484-64. The method of claim 61, wherein said forming a fiducial marker shape includes forming a beveled edge on the component.

65. A method of placing a component having leads and an alignment indicating fiducial marker, comprising:

detecting the alignment of the fiducial marker on the component;

comparing the detected fiducial alignment with a predetermined fiducial alignment;

providing an alignment signal; and

placing the component to a substrate when the detected fiducial alignment corresponds to the predetermined fiducial alignment.

66. The method of claim 65, wherein said providing an alignment signal further comprises prompting an operator.

67. The method of claim 65, further comprising providing the alignment signal to a pick and place machine.

68. The method of claim 65, wherein the alignment signal corresponds to the presence or absence of a portion of a component extending beyond the nest surface.

69. The method of claim 65, wherein the alignment signal corresponds to whether the component is properly aligned in a recess of a nest.

70. The method of claim 65, further comprising affecting a control scheme in response to the alignment signal.

71. A method of placing a component having leads and an alignment indicating fiducial marker, comprising:

directing a pattern of radiation across a nest having an asymmetric recess corresponding to an asymmetric shape of the component;

sensing the radiation pattern passing across the nest;

detecting the alignment of the fiducial marker on the component;

comparing the detected fiducial alignment with a predetermined fiducial alignment; and

placing the component to a substrate when the detected fiducial alignment corresponds to the predetermined fiducial alignment.

72. The method of claim 71, wherein said directing further comprises disrupting the radiation pattern when a component is misaligned in the nest recess.

73. The method of claim 71, wherein said comparing further comprises comparing the radiation pattern passing across the nest to a known radiation pattern.

74. A method of placing a component having leads and an alignment indicating fiducial marker, comprising:

detecting the alignment of the fiducial marker on the component;

comparing the detected fiducial alignment with a predetermined fiducial alignment;

determining a component alignment from said comparison of the fiducial alignment with the predetermined alignment; and

placing the component to a substrate when the detected fiducial alignment corresponds to the predetermined fiducial alignment.

75. The method of claim 74, further comprising calculating a component position offset.

76. The method of claim 75, further comprising:

moving a nest from a first position into alignment with the component;

placing the component in the nest; and

returning the nest to the first position.

77. A method of placing a component having leads and an alignment indicating fiducial marker, comprising:

detecting the alignment of the fiducial marker on the component;

comparing the detected fiducial alignment with a predetermined fiducial

alignment;

causing a pick and place machine to pick the component; and
placing the component to a substrate when the detected fiducial alignment
corresponds to the predetermined fiducial alignment.

78. The method of claim 77, further comprising aligning the component when
the detected fiducial alignment does not correspond to the predetermined fiducial
alignment.

79. A method of placing a component having leads to a substrate, comprising:
detecting alignment of a fiducial marker on the component; and
placing the component to the substrate when the detected fiducial alignment
corresponds to a predetermined fiducial alignment.

80. A method of placing a component having leads to a substrate, comprising:
comparing an alignment of a fiducial marker on a component with a
predetermined fiducial alignment; and
placing the component to the substrate when the detected fiducial
alignment corresponds to the predetermined fiducial alignment.

81. The method of claim 80, further comprising aligning the fiducial marker
on the component with the predetermined fiducial alignment.

82. A method of placing a component having leads and an alignment indicating
fiducial marker, comprising:

detecting the alignment of the fiducial marker on the component;
comparing the detected fiducial alignment with a predetermined fiducial
alignment;

aligning the component so that the fiducial marker corresponds to the
predetermined fiducial alignment; and

placing the component to the substrate when the detected fiducial alignment
corresponds to the predetermined fiducial alignment.--